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ABSTRACT

A HOW-to-do-it kit for educators interested in measuring career path development by utilizing criterion measures with domain objectives is presented in the format of a Self-paced, career path module. A career path refers to the growth from career exploration to career identity. A module is habitually composed of four parts: objectives, pretests, learning environments, and posttests. Criterion-referenced testing (CRT) is contrasted with norm-referenced testing (NRT). CRT stresses mastery and scoring in terms of measurable achievement. Examples are given of CRT items and scoring keys. NRT stresses position in the tank order of a group. NRT is not recommended as an effective measure of career path progress. Diagnostic pretest questions help readers identify needed sections of this document while mastery posttests help readers verify correct comprehension and application of criterion measures. This document is designed for the educator who wants to develop CRT career measures but has a limited budget and timetable. (Author/BJG)

ED107696

TITLE

DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES

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DATE

October 27, 1974

This document is in the format of a module learning packet containing :

- Specific OBJECTIVES
- Self-Assessment PRETESTS
- Alternative LEARNING ENVIRONMENTS
- Mastery POSTTESTS

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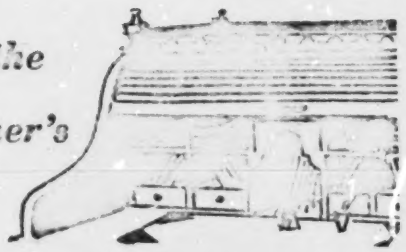
INTRODUCTION

From the publisher's desk



There was a time in the mid-1960's when the task of the tester was much simpler. All that had to be done was to thumb through a catalog and order the exact number of questionnaires needed. The scoring was done by machine. At the time, it seemed like there was nothing else that needed to be done to come up with local norms.

Now, ten years later, all that has changed. A new term has emerged : criterion-referenced testing. CRT has become an abbreviation which is constantly contrasted with norm-referenced testing (NRT). CRT is a testing process which utilizes only items directly related to prespecified objectives. These objectives furnish testing criteria in terms of learner outcomes.

This document entitled DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES is an attempt to organize the development of criterion-referenced test items. Such test items will serve to measure whether or not learners can or cannot accomplish the behavior, activity, performance, or skill stated in the criterion objective.

Several school districts have spent a large amount of money developing CRT systems. The tests developed have been transplanted to other systems. In many cases, these transplants did not take because of different local conditions.

It is the contention of this document that physically transplanting CRT systems from one district to another, from one school to another, from one teacher to another is not an effective innovation device.

The more effective transplant would be to transplant processes and criteria from one CRT developer to another. In this way, all CRT performance measures used by teachers will possess "local validity" in the sense that a valid test item for a highly specific objective may lack validity for a highly specific local objective just a little bit different.

This process of developing local CRT performance measures can be summarized in two stages :

STAGE ONE wherein teachers make a first attempt at analyzing, organizing, and packaging a combination of existing and new materials

STAGE TWO wherein teachers make a more formal attempt to evaluate, articulate, and systematize a wide variety of materials from colleagues and professional peers.

Each section of this document is intended to clarify the process of developing CRT performance measures for CAREER PATH MODULES. A career path refers to the growth from career exploration to career identity. A module is habitually composed of four parts : objectives, pretests, learning environments, and posttests.

This document will be in the format of a module. OBJECTIVES will be stated. Diagnostic PRETEST test items will be available to the readers. Specific LEARNING ENVIRONMENTS will discuss STAGE ONE and STAGE TWO. A mastery type POSTTEST will enable readers to confirm understanding, application, and appreciation of this process of developing performance measures.

INTRODUCTION TO MODULES

This document is in the format of a MODULE. As all modules, it contains four essential elements :

A list of OBJECTIVES

Self-Assessment PRETESTS

Alternative LEARNING ENVIRONMENTS

Mastery POSTTESTS

The OBJECTIVES give an idea of what to expect in the module. Objectives are unambiguous statements of intentions and expectations. Objectives as such can include knowledge objectives (KO), performance objectives (PO), attitude objectives (AO), basic research, proven strategies, valuable attitudes, significant opinions, basic skills, and relevancy analyses.

The PRETESTS allow readers to preassess module information, skills, and attitudes already possessed. The results of the pretest indicate where to begin the module and where to go for help appropriate to the reader's level of previous accomplishments. Pretests can be oral, written, performance, manual, or interaction-based.

The LEARNING ENVIRONMENTS can range from instructor-based to learner-center activities, demonstrations, methods, media, or strategies. The selection of the proper learning environment is based upon previous success, instructional experiences available, training background, expertise in the module objectives, favorite style or mode of learning, and reasonable time limit expectations.

The POSTTEST is an attempt to measure the learner's growth. The posttest measures how well the original module objectives have been met. Sometimes, the posttest may repeat items from the pretest. However, in the case of the posttest, the objective is measurement of mastery. Diagnosis is the objective of the pretest. Documentation of competency is the corresponding objective of the posttest.

Posttests can take many forms : teacher-constructed evaluation, performance-based task completion, learner self-assessment, contractual agreements, standardized instruments, rating scales, subjective impressions, minimum essentials performance, anecdotal records, or any combination appropriate to a given learner at a given time in the learning process.

This module contains all four ingredients listed above : objectives, pretest, learning environments, and posttest. The next page explains how to use this module.

HOW TO USE THIS MODULE

The following steps can simplify the utilization of this module and maximize the effectiveness to the reader.

STEP ONE - Examine carefully the objectives

If the objectives are already mastered, verify this claimed accomplishment by TAKING THE PRETEST.

If the objectives are of such a nature as to be as yet unattained, begin by WORKING THROUGH THE LEARNING ENVIRONMENTS.

STEP TWO - Take the pretest

If the pretest is successfully passed according to the suggested answer key, proceed to verification of mastery by TAKING THE POSTTEST.

If the pretest is not successfully passed, proceed to an appropriate learning activity by WORKING THROUGH THE LEARNING ENVIRONMENTS.

STEP THREE - Work through the learning environments

Look over the alternatives available.

Begin with a learning environment that seems to promise interest and success.

If it is felt that some of the objectives can be met at this time, diagnose this situation by TAKING THE PRETEST.

If it is felt that most of the objectives are now mastered, verify this impression by TAKING THE POSTTEST.

STEP FOUR - Take the posttest

If the posttest is successfully passed, go on to an appropriate next step, for example, another module or an alternate learning procedure.

If the posttest is not successfully passed, analyze the missing competencies by REEXAMINING THE OBJECTIVES, or by RETAKING THE PRETEST, or by AGAIN WORKING THROUGH THE LEARNING ENVIRONMENTS provided in the module.

The above four steps can simplify the process of getting used to learning with modules as vehicles of self-instruction, self-assessment, and self-determination of goals.

In order to keep track of the needed module ingredient, it is suggested that the reader refer to the TABLE OF CONTENTS in order to find the beginning or first page for each of the following :

OBJECTIVES

PRETEST

LEARNING ENVIRONMENTS

POSTTEST

These four components can well become a method of learning on one's own in a variety of alternatives.

Expert users of modules have found an uncomplicated and direct way to analyze, organize, and structure the many parts of a typical module.

The first step is to recognize that all modules are composed of OBJECTIVES, EVALUATIONS (from which both PRETESTS and POSTTESTS can be developed), and RESOURCES.

The second step is to subdivide objectives, evaluations, and resources into KNOWLEDGE, PERFORMANCE, and ATTITUDE components.

The third step is to specify three types of goals :
KNOWLEDGE OBJECTIVES or KO,
PERFORMANCE OBJECTIVES or PO, and
ATTITUDE OBJECTIVES or AO.

The fifth step is to specify three types of tests :
KNOWLEDGE EVALUATION or KE,
PERFORMANCE EVALUATION or PE, and
ATTITUDE EVALUATION or AE.

The sixth step is to specify three types of tools :
KNOWLEDGE RESOURCES or KR,
PERFORMANCE RESOURCES or PR, and
ATTITUDE RESOURCES or AR.

This gives an easy to remember 3 x 3 matrix : .

KO	PO	AO
KE	PE	AE
KR	PR	AR

OBJECTIVES FOR DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES

As a result of studying this document, the reader will be able to:

1. Translate local objectives for career education into measurable criterion objectives.
2. Develop criterion-references testing measures that provide pretest and posttest data upon which to determine gains scores in career education.
3. Quantify measures of the effectiveness of various career path programs.
4. Plan career education upon a framework of specific data and information.
5. Break out of the built-in limitations of norm referenced testing.
6. Incorporate a large variety of career path training modules available from other schools, agencies, institutions, and organizations sharing similar career education objectives.

One fundamental observation must be made about these objectives. The traditional system of marking, examing, grading, credit granting, and advancement is open to distortions as far as career path growth is concerned. Good teaching, as well as measurable learning, presumes an objective standard. An objective standard is something against which progress can be measured. This progress is called a gains score.

Students in career education imagine there is some sort of standard towards which the students are working. This standard is seldom spelled out in detail either to parents or to students or to teachers. Employers assume that the learner's credentials denote achievement of some standard of career education. Compared with today's standards, the origin of a foot as anything from a size 5 to a size 15 is remarkably precise.

This document is intended to help teachers measure objectives that can be measured, not by comparing one learner against another, but by comparing each learner against chosen or imposed objectives. More and more, teachers are beginning to use such criterion objectives as the basis of evaluation. In certain subjects, criterion measures are obvious. In the area of career path growth, the criterion measures must be made more obvious. and understandable to the average learner.

Career path criterion measures offer several promises:

A. Accurate self-evaluation must be sponsored.

B. All learning objectives should be appraised.

C. Teaching and learning should be organized around objectives.

D. Records should be used for decision making.

E. Reliable norms for decision making should be based upon criterion values.

It is obvious that one principle runs through all attempts to measure career path gains: Learners are judged on more than what they know. This refers to basic skills and attitudes essential to the learning process.

Criterion measures force teachers to layout expectations in terms learners can understand. This fosters mutual cooperative and directly leads to better gains scores.

PRETEST for

DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES

DIRECTIONS : Indicate all answers chosen on the ANSWER SHEET provided.

Verify all answers selected by consulting the ANNOTATED SUGGESTED ANSWER KEY.

TRUE FALSE 1. CRT abbreviates criterion-referenced testing.

TRUE FALSE 2. NRT abbreviates norm-refernced testing.

TRUE FALSE 3. CRT and NRT are essentially synonymous.

TRUE FALSE 4. CRT performance measures utilize only test items directly related to pre-specified objectives.

TRUE FALSE 5. The objectives used to specify criteria for CRT performance measures are in terms of learner outcomes, performances, skills, attitudes, and growth.

TRUE FALSE 6. CRT performance measures are used to determine whether or not students can perform as expected in the specific criterion objectives under evaluation.

TRUE FALSE 7. NRT evaluative measures are intended to provide group norms.

TRUE FALSE 8. NRT EVALUATION MEASURES use group norms which show the standing of one individual in relation to others in the group being tested.

TRUE FALSE 9. Percentiles are used in CRT and not at all in NRT.

TRUE FALSE 10. Usually, percentiles must be interpreted in terms of prespecified objectives.

DIRECTIONS : Some multiple choice have more than one answer.

11. With a good set of NRT evaluative measures, a teacher is able to

A. Rank individual learners in the group with greater accuracy
B. Diagnose specific learning difficulties in terms of objectives to be attained
C. Show the relative standing of one individual testee in relation to others taking the same NRT evaluative measure
D. Measure mastery of prespecified learner outcomes
E. Zero in on prespecified standards of mastery

12. With a good set of CRT performance measures, a teacher is able to

A. Develop group percentiles
B. Mark on the curve
C. Establish undisputable class ranks
D. Measure mastery, partial mastery, or lack of mastery of prespecified criterion objectives
E. Use stanines in scoring exams

13. When a learner fails a CRT performance measure, he is told

A. Seventy per cent of the class did better than you
B. It's your fault you failed
C. You failed to achieve the desired mastery outcome AT THIS TIME
D. You never will get another chance to try again
E. Better luck next time since it's all a matter of luck rather than lack of competency on your part

14. In a CRT performance measure environment type of classroom, the teacher

A. Must give every student an "A"
B. Must compute grades on the curve and on the percentile system and then give each learner the highest grade
C. Usually explains the criterion objectives before testing for mastery
D. Must give out at least fifty per cent of the actual test questions to be used before the test date
E. Maintains no record of how many objectives were accomplished to date by each learner but relies instead on group norms

ANNOTATED SUGGESTED ANSWER KEY FOR PRETEST FOR DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES

ANSWERS		ANNOTATION
1.	True	CRT
2.	True	NRT
3.	False	Contrasting approaches
4.	True	Prespecified objectives
5.	True	Measureable outcomes
6.	True	Visible outcomes
7.	True	Group norms
8.	True	Relative rank
9.	False	NRT uses percentiles
10.	False	Percentiles are interpretated in terms of groups
11.	A, C	NRT ranks group members
12.	D	CRT measures mastery
13.	C	CRT always provides another chance
14.	C	Individual norms prevail

LEARNING ENVIRONMENTS for

DEVELOPING CRITERION MEASUREMENTS

STAGE ONE - The First Attempt

The following pages present an abbreviated example of developing criterion measurements. This example is abbreviated because several of the brainwashing steps which led up to the final product have been eliminated. This elimination was done to focus more directly on the type of product that can be expected from classroom teachers applying these techniques of criterion measure development.

The following page entitled PRETEST DATA : COUNTABLES is intended to sum up the data needed by the school personnel in order to measure the impact of a special program. Thus, it was deemed necessary to specify four factors :

FACTOR A : Diploma Potential

FACTOR B : Testables

FACTOR C : Products

FACTOR D : Curriculum

Inspection of the following page can reveal the operational definition of each factor being measured.

PRETEST DATA

COUNTABLES

Diploma Potential

Category	Per Cent	Cumulative Per Cent
Grade School Graduate	15	100
High School Graduate	45	85
Community College Graduate	20	40
Four Year College Graduate	20	20

Testables

Pretest and posttest scores on the eight components of Career Educatio

Pretest and posttest scores on five career clusters.

Products

Year 1 - 5 career clusters in the form of learner-paced modules

Year 2 - 5 more career clusters

Year 3 - 5 additional career clusters

Curriculum

The curriculum will be SEQUENTIAL in the sense that five different clusters will be studied in each of three years.

The curriculum will be CYCLICAL in the sense that the eight career education components will be studied in more depth each year.

A SAMPLE OF COUNTABLE PRETEST DATA

FACTOR B (TESTABLES) from the preceding page refers to pretests on the eight components of Career Education.

One of the eight components of Career Education is commonly referred to as the development that occurs as the learner grows from SELF-AWARENESS to SELF-IDENTITY.

There are many possible ways to measure SELF-AWARENESS growth. One way is to give the PRETEST found on the following page at the beginning of the school year and to give a similar POSTTEST at the close of the school year. The difference in learner scores indicates growth if the posttest is higher in desired traits.

The following page is the PRETEST measuring growth from SELF-AWARENESS to SELF-IDENTITY. This test was developed by junior high school educators. This page is given to students.

The next page entitled ANSWER SHEET is also given to learners. Since students do not write on the PRETEST page, all responses are put on this answer sheet.

The following page after the answer sheet is entitled SCORING KEY. This page is for teachers only. The scoring key explains how to interpret and analyze the answer sheet of each student.

QUESTIONNAIRE

DIRECTIONS: Place answers on special ANSWER SHEETS provided.

PRETEST

from SELF-AWARENESS to SELF-IDENTITY

1. Which is most important to you?

   A. Money
   B. Good paying job
   C. Community status
   D. Work I like

2. Which is 2nd most important?

3. Which is 3rd most important?

4. Which is least important?

5. What activity would you most enjoy participating in?

   A. Going on a tour of Washington, D.C.
   B. Watching a baseball game
   C. Working in the garden
   D. Managing a baseball team
   E. Organizing a local club

6. Which is 2nd most important?

7. Which is 3rd most important?

8. Which is least important?

9. Describe what you think of yourself in each of the following categories:

   A. Appearance:
   B. Personality:
   C. Interest:
   D. Abilities:

10. How would you like to be different in each category?

ANSWER SHEET

from SELF-AWARENESS to SELF-IDENTITY

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D E
6. A B C D E
7. A B C D E
8. A B C D E

9. A. Appearance: _____

_____

B. Personality: _____

_____

C. Interest: _____

_____

D. Abilities: _____

_____

10. A. _____

_____

B. _____

_____

SCORING KEY

PRETEST from SELF-AWARENESS to SELF-IDENTITY

1. A little more introspection is evident if the response
2. changes from money as high to money as low.
3.
4.

5. A little more realism is evident if Hi-pre A, B changes
6. to Low-post A,B and if Low-pre C,D,E changes to Hi-post C,D,E.
7.
8.

9. 1 point for SPECIFIC
   1 point for MEASURABLE

10. 1 point for POSITIVE
    1 point for POSSIBLE (REALISTIC)

LOOKING BACK OVER STAGE ONE

Stage One can be summed up in the following sequence :

1st -- Several educators tried to pinpoint baseline data.

This resulted in PRETEST DATA : COUNTABLES.

2nd -- These educators tried to gather PRETEST DATA on present student levels of GROWTH FROM SELF-AWARENESS TO SELF-IDENTITY

This resulted in a PRETEST : from SELF-AWARENESS to SELF-IDENTITY.

3rd -- This PRETEST was operationalized in three parts :

1: A QUESTIONNAIRE to be given to each student.

2: An ANSWER SHEET upon which students are to write answers to the questionnaire.

3: A SCORING KEY with which teachers and educators are to score and interpret the responses found on answer sheets filled out by students.

The QUESTIONNAIRE, the ANSWER SHEET, and the SCORING KEY referred to appear on the preceding three pages.

STAGE TWO - A Formalized Attempt

Further reflection upon the materials developed in stage one led to the recognition of the need for a more systematic and formalized approach to the problem of providing an adequate PRETEST. A more adequate pretest was operationally defined as an evaluation instrument which would lend itself to testing (a pretest in the first weeks of the school year) and to retesting (a posttest in the last weeks of the school year) in order to obtain a GAINS SCORE.

The GAINS SCORE was defined as the difference between the pretest and the posttest taken by each individual. The average of the individual gains scores (both positive and negative) was defined as the GROUP GAINS SCORE.

This PRETEST was to be a criterion-referenced evaluation instrument containing only items directly related to previously stated objectives. Each of these prestated objectives was to be a student outcome. In the example found in stage one, the student outcome was to "grow from self-awareness to self-identity." In stage two, the student outcome is to "grow from educational awareness to educational identity."

In stage one, the format of the developed product was as follows :

1: QUESTIONNAIRE

2: ANSWER SHEET

3: SCORING KEY (from which prespecified objectives could be inferred).

It was found that going backward from a test item to an implied objective was possible. However, such a path seemed backward since it would be more direct to state an objective and then to seek out or develop an appropriate evaluation or test item.

In addition, it was felt that greater thoroughness would result from subdiving a concept such as EDUCATIONAL AWARENESS into component parts. This would avoid testing only superficial and external aspects of this important starting point for EDUCATIONAL IDENTITY.

In this way, the format of stage two emerged as follows :

1: CRITERION OBJECTIVES

2: TEST ITEMS

3: ANSWER SHEET

4: SCORING KEY.

In this example, simplicity has been stressed by giving only one test item per objective.

For example, objective 1 is measured by test item 1 on the following page. If it had been desired to give two more test items with which to measure objective 1, one convenient way to keep track of this correlation would be to number these test items 1B and 1C.

Similarly, objective 2 is measured by test item 2 on the following page.

To see how well the reader understands the following pages, an example is provided. Try to determine the PRETEST score of a student whose answer sheet looks like this :

1. (A) B C D E
2. A B (C) D E
3. A (B) C D E
4. A B C (D) E

Try to determine the POSTTEST score of a student whose answer sheet looks like this :

1. A B C (D) E
2. A B C (D) E
3. A B C (D) E
4. A B C D (E)

As a final exercise, try to determine the GAINS SCORE FOR THIS INDIVIDUAL STUDENT. Don't look at the answers given after the scoring key until after trying to figure it out beforehand.

EDUCATIONAL AWARENESS

CRITERION OBJECTIVES

Each learner will:

1. Specify a personal reason for going to school.
2. Back up this personal reason with data.
3. Plan post-secondary job or college in terms of a career.
4. Identify at least one educational goal to be accomplished in junior high school.

EDUCATIONAL AWARENESS

TEST ITEMS

Directions: Place all answers on ANSWER SHEET.

1. What is the most important reason why you go to school?

   A. To learn things to prepare me better for my future.
   B. I have no place else to go.
   C. I am forced to.
   D. I like school.
   E. I don't know.

2. How will you decide which high school program to attend?

   A. I will go where my friends go.
   B. I will seek advice from parents, counselors, or teachers.
   C. I have no idea.
   D. I will seek a high school where I can develop my interests and abilities.
   E. I will go to the high school where the work is easiest.

3. How will you decide what to do after high school?

   A. I'll have to find-out if the job I want requires more education or training.
   B. I won't think about it till after I graduate.
   C. I'll do what my parents want me to do.
   D. It depends upon my grades and interests.
   E. I have no idea.

4. What's your most important goal at school this year?

   A. Getting good grades.
   B. Staying out of trouble.
   C. Learning more about my favorite subject.
   D. Passing with as little homework as possible.
   E. I don't know.

EDUCATIONAL AWARENESS

ANSWER SHEET

1. A B C D E

2. A B C D E

3. A B C D E

4. A B C D E

EDUCATIONAL AWARENESS

SCORING KEY

1. Positive: A, D
   Neutral : E
   Negative: B, C

2. Positive: B, D
   Neutral : C
   Negative: A, E

3. Positive: A, D
   Neutral : E
   Negative: B, C

4. Positive: A, B
   Neutral : E
   Negative: C, D

DIRECTIONS:

Only one choice may be scored per test item.
Answer sheets with more than one choice circled by students are to be voided.

Give one point (+1) for each positive response.
Give minus one point (-1) for each negative response.
Give zero points (0) for each neutral response.

Add up the total for all four questions to obtain the INDIVIDUAL SCORE which may range between (-4) and (+4).

For example, (+1) plus (0) plus (-1) plus (-1) equals a TOTAL INDIVIDUAL SCORE of (-1).

Similarly, (+1) plus (+1) plus (+1) plus (0) equals a TOTAL INDIVIDUAL SCORE of (+3).

ANSWERS FOR THE PRECEDING EXAMPLE

The preceding example which analyzed the last four pages can be answered as follows: First, the question number for each test item (ITEM NUMBER), second, the student's response (STUDENT RESPONSE), third, the scorking key weight (SCORING WEIGHT), and finally the TOTAL INDIVIDUAL SCORE.

PRETEST

ITEM NUMBER	STUDENT RESPONSE	SCORING WEIGHT
1	A	+1
2	C	0
3	B	-1
4	D	-1
TOTAL INDIVIDUAL SCORE----------		(-1)

POSTTEST

1	D	+1
2	D	+1
3	D	+1
4	E	0
TOTAL INDIVIDUAL SCORE----------		(+3)

For this student, the PRETEST is (-1) and the POSTTEST is (+3).

The formula for the INDIVIDUAL GAINS SCORE is (POSTTEST) minus (PRETEST).

Recalling the laws of addition and subtraction for signed numbers, it can be demonstrated that (+3) minus (-1) equals (+4).

This means that the INDIVIDUAL GAINS SCORE for this individual is (+4).

The plus sign (+) indicates a positive gains score. A negative sign (-) would indicate a negative gains score. A negative gains score means that the learner's posttest was lower than the learner's pretest.

So much for the mathematics of scoring the four test items used in this example.

The next few pages will delve into the underlying principles that led up to the test items and the scoring key.

PHASE ONE : Teacher-Developed Questions

After stating a criterion objective, each teacher developed a correlated multiple choice test item with five alternatives.

FOR EXAMPLE :

a. An objective was stated :

THE LEARNER WILL
SPECIFY A PERSONAL REASON
FOR GOING TO SCHOOL

b. A question was developed :

WHAT IS THE MOST IMPORTANT
REASON WHY YOU GO TO SCHOOL?

c. Alternatives were provided :

A. To learn things to prepare me better for my future
D. I like school

E. I don't know

B. I have no place else to go
C. I am forced to

d. Alternatives were weighted to provide 2 positive weightings of (+1), one neutral weighting of (0), and two negative weightings of (-1).

In the opinion of the teachers doing the weightings, A and D were (+1)
E was (0), and
B and C were (-1).

This is the process used to construct the sample of four test items discussed in this stage two. It is appropriate at this point to ask a few questions about the validity of this approach.

This approach permits teachers to recall typical responses indicative of positive, neutral, or negative individuals. Usually, subjecting such suggested responses to the professional opinion of the teachers concerned is enough for local purposes.

For larger samples, a statistical sampling might help come up with alternative responses which have the following characteristics :

RESPONSES COMING FROM A STRATIFIED SAMPLE will

a. be closer to actual language of the population being tested

b. reflect more clearly the actual positive and negative concerns of the target population

c. be less contaminated by teacher or tester unconscious bias

d. give a flavor of reality to the teacher-developed questions by incorporating learner-edited alternatives to the questions under investigation

e. provide a larger sample of learner response from which testers can construct bias-free alternatives.

Thus, the next phase is learner-edited questions.

PHASE TWO : Learner-Edited Questions

Phase two can be inaugurated very simply. The teacher develops an open-ended questionnaire. In this case, the questions would be :

1. WHAT IS THE MOST IMPORTANT REASON WHY YOU GO TO SCHOOL?
2. HOW WILL YOU DECIDE WHICH HIGH SCHOOL PROGRAM TO ATTEND?
3. HOW WILL YOU DECIDE WHAT TO DO AFTER HIGH SCHOOL?
4. WHAT'S YOUR MOST IMPORTANT GOAL AT SCHOOL THIS YEAR?

The teacher tests a sample of learners from each of several possible strata. For example,

5 learners could be tested from each of the top two groups

10 learners could be tested from the middle group

5 learners could be tested from each of the bottom two groups

This sampling is for the teacher with five groups.

The teacher categorizes the sample responses to the open-ended questions as either positive, neutral, or negative in light of the criterion objective for each test item.

The teacher edits the alternatives in the multiple choice questions in light of the open-ended responses. This permits a refined testing instrument to be used to gather both pretest and posttest data.

This detailed execution of phase two is not presented in detail.

It is left as an exercise to the interested reader.

A FEW GUIDELINES ARE IN ORDER :

1. The above examples, both in stage one and in stage two are presented to provoke thought rather than to prescribe THE ONLY WAY TO DO IT.

2. For all practical purposes, local validity means satisfying all local participants as to the worthwhileness of any pretest or posttest used.

3. For statistical validity, the pretest and posttest used to determine must be identical or similar to provide a valid

comparison of the effect of a program on the test scores of selected learners.

FOR EXAMPLE, if the PRETEST used were the one developed in phase one, it would not be appropriate to use the POSTTEST developed in phase two even though the stems of each question were identical. Changing, and improving, the alternatives changes the nature of the testing instrument.

The only exception to the above would be statistical proof that a pretest such as the one developed in phase one were statistically equivalent to a posttest such as the one developed in phase two.

If there were a stage three, it would be entitled : DO IT YOURSELF, YOUR OWN WAY, WITH LOCAL PERSONNEL.

After you have had a chance to work out phase two on your own, look at the following pages. They reveal what one teacher did in applying phase one and phase two in his own school. The patterns used was :

CRITERION OBJECTIVES
TEST ITEMS
ANSWER SHEET
SCORING KEY

Perusal of the following pages will reveal local adaptations.

SELF-AWARENESS

CRITERION OBJECTIVE

The learner will be able to:

1. Identify at least two areas of interest in school and out of school

2. Specify at least two academic and two non-academic strengths or abilities

3. Identify at least two areas where improvement is desired

SELF-AWARENESS

TEST ITEMS

1. I can describe my interests in school in the following way:

   A. I'm not especially interested in anything at school

   B. I can list two things I'm interested in at school.

      They are:

      1st _____

      2nd _____

   C. I can't answer this question

2. I can describe my interests outside of school in the following way:

   A. I'm not especially interested in anything outside of school

   B. I can list two things I'm interested in outside of school.

      They are:

      1st _____

      2nd _____

   C. I can't answer this question

3. I can describe my abilities in school in the following way:

   A. I'm not especially good at anything in school

   B. I can list the following two things I'm good at in school.

      They are:

      1st _____

      2nd _____

   C. I can't answer this question

4. I can describe my abilities outside of school in the following way:

   A. I'm not especially good at anything outside of school

   B. I can list the following two things I'm good at outside of school.

      They are:

      1st _____

      2nd _____

   C. I can't answer this question

5. Where do you feel you desire to improve?

   A. There's nothing I'd like to be better at.

   B. I can list two things I'd like to be better at.

      They are:

      1st _____

      2nd _____

SELF-AWARENESS

ANSWER SHEET

1. A B C (if you choose B, fill in below)

   1st _____

   2nd _____

2. A B C (if you choose B, fill in below)

   1st _____

   2nd _____

3. A B C (if you choose B, fill in below)

   1st _____

   2nd _____

4. A B C (if you choose B, fill in below)

   1st _____

   2nd _____

5. A B C (if you choose B, fill in below)

   1st _____

   2nd _____

SELF-AWARENESS

SCORING KEY

FOR ALL QUESTIONS:

Positive: B

Neutral: C

Negative: A

LOCKING BACK OVER STAGE TWO

The following page entitled AN EXAMPLE OF DEVELOPING CRITERION MEASURES outlines how to correlate GOALS and RESOURCES.

Phase one, and the role of teachers in developing criterion measures, is outlined in detail. Phase one enables a teacher to go through the entire process relying upon the best of recalled student experiences and responses.

Phase two, and the role of learners in editing questions and alternative responses, is similarly outlined in detail. Phase two enables educators to draw upon both statistical sampling and available student samples in order to document the criterion measures locally developed.

The message is obvious :
STUDENTS VARY FROM SCHOOL TO SCHOOL.
What worked in one school might not work in another.
TRANSPORTING PROCESSES SUCH AS PHASE ONE AND PHASE TWO WILL LEAD TO LESS ERRORS THAN TRANSPORTING TEST ITEMS WHOLESALE FROM ONE PROGRAM TO ANOTHER.

The following page summarizes these processes which can be transported safely from one school to another.

An Example of Developing

CRITERION MEASURES

① GOALS

OBJECTIVE ONE is to:

Develop criterion-referenced tests to help evaluate growth of individual children.

② RESOURCES

PHASE ONE: TEACHER-DEVELOPED QUESTIONS

One process to attain this objective can include four steps:

Step 1 : State a criterion objective

Step 2 : Develop a correlated multiple choice test item with five alternatives

Step 3 : Plan a student ANSWER KEY

Step 4 : Specify the SCORING KEY with 2 positive, 1 neutral, and 2 negative responses identified

PHASE TWO: LEARNER-EDITED QUESTIONS

Each of the test items can also be asked in an open-ended fashion to a sample of learners.

Step 1 : Develop open-ended questionnaire

Step 2 : Test a sample of 5 learners from each of the five strata

Step 3 : Categorize sample open-ended responses as either positive, neutral, or negative

Step 4 : Edit the alternatives in the multiple choice questions in light of the open-ended responses

POSTTEST for

DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES

DIRECTIONS : Indicate all answers chosen on the ANSWER SHEET PROVIDED.

Verify all answers selected by consulting the ANNOTATED SUGGESTED ANSWER KEY.

1. A CRT performance measure

   A. Always provides percentiles
   B. Always provides group norms
   C. Sometimes provides criterion objectives
   D. Always provides criterion objectives
   E. Sometimes ignores desired student outcomes

2. A NRT evaluative measure

   A. Is based upon a prespecified learner objective
   B. Is impossible without a complete behavioral objective
   C. Is helpful in determing group percentile comparisons
   D. Utilizes only test items directly related to previously stated learner objectives
   E. Provides only a pass or fail type of scoring

3. A student who is bragging about his NRT evaluation results will be inclined to say

   A. I made the third highest grade in a class of thirty-five students
   B. I achived only the first three objectives of the seven required for complete mastery
   C. I still have only one more objective out of nineteen to achieve
   D. I'm good in math graphing but the math formulas give me a lot of trouble
   E. I've accomplished most of the career awareness subobjectives but I've still got a number of career identity objectives to attain

4. A high rank in NRT evaluation is insignificant if

   A. Everyone got a high rank
   B. The highest ranking individual hasn't achieved much
   C. All class members were able to demonstrate competency
   D. Ninety per cent of the group are over-achievers
   E. Five per cent of the group are under-achievers

TRUE FALSE 5. An INDIVIDUAL PROFILE on self-awareness or on career awareness summarizes the test results of one individual.

TRUE FALSE 6. A GROUP PROFILE on self-awareness or on career awareness summarizes the test results of several learners arranged in a group.

TRUE FALSE 7. The PRETEST RESPONSE of a learner is in terms of a particular response chosen.

TRUE FALSE 8. For all PRETEST RESPONSES, alternative A would have the same meaning on all questions.

TRUE FALSE 9. For all POSTTEST RESPONSES, alternative A would have the same meaning on all questions.

TRUE FALSE 10. Both the PRETEST RESPONSE and the POSTTEST RESPONSE must be translated into the appropriate code, that is, (+1) or (0) or (-1) in order to classify the meaning of the response chosen by each individual.

TRUE FALSE 11. It is conceivable that a PRETEST RESPONSE of B on question 1 could be (+1) while a PRETEST RESPONSE of B on question 2 could be (-1).

TRUE FALSE 12. In the same way, a PRECODE of (+1) on question 3 is treated differently than a PRECODE of (+1) on question 4.

TRUE FALSE 13. A learner with a POSTCODE OF (0) and a PRECODE of (-1) on the same question has achieved a gains score of (+1).

DIRECTIONS : Some of the following multiple choice questions may have more than one required correct alternative.

14. The PRECODE was (0) and the POSTCODE was (0), therefore the GAINS SCORE for this question was

A. zero
B. (+1)
C. (-1)
D. (+2)
E. Indicative of growth
F. Indicative of decline

15. The POSTCODE was (0) and the PRECODE was (-1), therefore the GAINS SCORE was

A. zero
B. (+1)
C. (-1)
D. (+2)
E. Indicative of growth
F. Indicative of decline

16. The POSTCODE was (-1) and the PRECODE was (0), therefore the GAINS SCORE WAS

A. zero
B. (+1)
C. (-1)
D. (+2)
E. Indicative of growth
F. Indicative of decline

17. A GAINS SCORE of (-1)

A. Means nothing has happened
B. Is indicative of decline
C. Is indicative of growth
D. Means the PRETEST was higher than the POSTTEST
E. Means the POSTTEST was lower than the PRETEST

18. A GAINS SCORE of (0)

A. Means nothing has happened
B. Means no measurable growth has been registered in the predefined growth categories
C. Results from having both PRETEST and POSTTEST codes identical
D. Could result from a PRECODE of (+1) and a POSTCODE of (+1)
E. Could result from a PRECODE OF (-1) and a POSTCODE of (-1)
F. Could result from a PRECODE OF (0) and a POSTCODE of (0)

19. A GAINS SCORE of (+1)

A. Could result from a POSTCODE of (-1) and a PRECODE of (0)
B. Could result from a PRECODE of (0) and a POSTCODE of (+1)
C. Could result from a PRECODE of (+1) and a POSTCODE of (0)
D. Indicates growth
E. Indicates decline
F. Means the program was perfect

20. Go back to the learning environment and examine the four questions on career awareness. Try to develop an individual profile which will identify pretest response, posttest response, posttest code, pretest code, and gains score for each individual. Make provision for a total score on career awareness. Make provision for a measure of decision making.

21. After you have had a chance to look at the answer sheet giving the individual profile on career awareness, try to develop a group profile which will provide a raw count per alternative and a code percentage per question. This data should be open to gains score interpretation. The group profile should provide a total score for career awareness. The group profile should provide a total score for decision making.

22. Try to repeat the above process used in question 20 in order to develop an individual profile for self-awareness based on the five self-awareness questions contained in the learning environment.

23. Using the results of question 22, try to prepare a group profile on self-awareness.

ANNOTATED SUGGESTED ANSWER KEY FOR
POSTTEST FOR
DEVELOPING CRITERION MEASURES FOR CAREER PATH MODULES

ANSWERS		ANNOTATION
1.	D	CRT always provides criterion objectives
2.	C	NRT helps determine group percentile comparisons
3.	A	NRT provides little more than group comparisons and very little specific diagnosis
4.	B	NRT ranking is only as good as the level of competency in the group being ranked
5.	True	Individual profile
6.	True	Group profile
7.	True	Pretest response
8.	False	Pretest response
9.	False	Posttest response
10.	True	Appropriate code
11.	True	No growth situation
12.	False	All precodes are treated similarly Responses must be put into codes before treatment
13.	True	An example of a growth situation
14.	A	An example of zero growth
15.	B	An example of growth
16.	C	An example of negative growth
17.	B, D	A negative score indicates the pretest was higher than the posttest
18.	B, C, D, E, F	A gains score of zero can result from many different situations
19.	B, D	A gains score of one indicates some measurable growth on predefined categories
20.		
20.	See the page entitled Career Awareness Individual Profile.	
21.	See the page entitled Career Awareness Group Profile.	
22.	See the page entitled Self-Awareness Individual Profile.	
23.	See the page entitled Self-Awareness Group Profile.	

CAREER AWARENESS

INDIVIDUAL PROFILE

Name (Family) (First) _____ (Birth Date) _____ (TEST DATE) _____

GROUP IDENTIFICATION _____ (RETEST DATE) _____

CRITERION OBJECTIVE	PRETEST RESPONSE	POSTTEST RESPONSE	POST-CODE	PRE-CODE	GAINS SCORE
SPECIFY a personal reason for going to school					
BACK UP this personal reason with data					
PLAN post-secondary job or school in terms of a career					
IDENTIFY at least one educational goal to be accomplished in junior high school					
CAREER AWARENESS (TOTAL of above four)	X	X			
DECISION MAKING (TOTAL of "0" in the first four codes)	X	X			

CAREER AWARENESS

GROUP PROFILE

_____ (TEST DATE)

_____ GROUP IDENTIFICATION

_____ (RETEST DATE)

CRITERION OBJECTIVE		Raw Count Per Alternative					Code-Percentage Per Question			GAINS SCORE
SPECIFY a personal reason for going to school	POST	A	B	C	D	E	(+1)	(0)	(-1)	
	PRE	A	B	C	D	E	(+1)	(0)	(-1)	
BACK UP this personal reason with data	POST	A	B	C	D	E	(+1)	(0)	(-1)	
	PRE	A	B	C	D	E	(+1)	(0)	(-1)	
PLAN post-secondary job or school in terms of a career	POST	A	B	C	D	E	(+1)	(0)	(-1)	
	PRE	A	B	C	D	E	(+1)	(0)	(-1)	
IDENTIFY at least one educational goal to be accomplished in junior high school	POST	A	B	C	D	E	(+1)	(0)	(-1)	
	PRE	A	B	C	D	E	(+1)	(0)	(-1)	
CAREER AWARENESS (TOTAL of above four)	POST									
	PRE									
DECISION MAKING (TOTAL of "0" in the first four codes)	POST									
	PRE									

SELF-AWARENESS

INDIVIDUAL PROFILE

Name (Family) (First) (Birth Date) (TEST DATE)

GROUP IDENTIFICATION (RETEST DATE)

CRITERION OBJECTIVE	PRETEST RESPONSE	POSTTEST RESPONSE	POST-CODE	PRE-CODE	GAINS SCORE
IDENTIFY at least two areas of interest IN SCHOOL					
IDENTIFY at least two areas of interest OUTSIDE SCHOOL					
SPECIFY at least two ACADEMIC strengths					
SPECIFY at least two NON-ACADEMIC strengths					
SPECIFY at least two areas where improvement is desired					
SELF-AWARENESS (TOTAL of above five)	X	X			
DECISION MAKING (TOTAL of "0" in the first five codes)	X	X			

SELF-AWARENESS

GROUP PROFILE _____ (TEST DATE)

GROUP IDENTIFICATION _____ (RETEST DATE)

CRITERION OBJECTIVE		Raw Count Per Alternative			Code-Percentage Per Question			GAINS SCORE
IDENTIFY at least two area of interest IN SCHOOL	POST	A	B	C	(+1)	(0)	(-1)	
	PRE	A	B	C	(+1)	(0)	(-1)	
IDENTIFY at least two areas of interest OUTSIDE SCHOOL	POST	A	B	C	(+1)	(0)	(-1)	
	PRE	A	B	C	(+1)	(0)	(-1)	
SPECIFY at least two ACADEMIC strengths	POST	A	B	C	(+1)	(0)	(-1)	
	PRE	A	B	C	(+1)	(0)	(-1)	
SPECIFY at least two NON-ACADEMIC strengths	POST	A	B	C	(+1)	(0)	(-1)	
	PRE	A	B	C	(+1)	(0)	(-1)	
SPECIFY at least two areas where improvement is desired	POST	A	B	C	(+1)	(0)	(-1)	
	PRE	A	B	C	(+1)	(0)	(-1)	
SELF-AWARENESS (TOTAL of above five)	POST	X	X	X	(+1)	(0)	(-1)	
	PRE	X	X	X	(+1)	(0)	(-1)	
DECISION MAKING (TOTAL of "0" in the first five codes)	POST	X	X	X	(+1)	(0)	(-1)	
	PRE	X	X	X	(+1)	(0)	(-1)	

SUGGESTED BIBLIOGRAPHY

RECOMMENDED PUBLICATIONS

The following MICROFICHE in the ERIC collection and summarized in RESEARCH IN EDUCATION (RIE) are called to the attention of educators wishing to update staff and learning centers :

ERIC CODE	CONTENTS
ED 056-994	HOW TO CLARIFY INSTRUCTIONAL GOALS
ED 074-032	HOW TO INDIVIDUALIZE CLASSROOM INSTRUCTIONAL GOALS
ED 086-988	HOW TO KEEP EDUCATIONAL RESEARCH FROM GATHERING DUST ON A SHELF
ED 088-861	PLANNING AND IN-SERVICE EDUCATION
ED 085-354	CHECKLIST ON HOW TO TAKE A GOAL APART AND HOW TO PUT IT BACK TOGETHER IN AN INSTRUCTIONAL SYSTEM
ED 090-175	SEVEN STEPS TO BETTER OBJECTIVES
ED 090-227	ROLE OF THE RESPONSIBLE LEADER IN DEVELOPING TEACHER-PREPARED RESEARCH
ED 090-976	CISNE - COMPUTERIZED INFORMATION SYSTEM FOR NURSING EDUCATORS
ED	EVALUATING COOPERATIVE EDUCATION
ED	LEADERSHIP BY REINFORCEMENT
ED 092-595	AN EVALUATION SYSTEM THAT DOESN'T REQUIRE HYPER-EXPERTS